# /20Cross-Cultural Examination of College Drinking Culture in Spain, Argentina, and USA:

# Measurement Invariance Testing of the College Life Alcohol Salience Scale

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**Abstract**

**Objective:** Perceptions about what is "normal" drinking in college, measured by the College Life Alcohol Salience Scale (CLASS; 15 items), have been robustly associated with elevated levels of problematic alcohol use, yet the role of these beliefs has not been studied outside the U.S. The present work examined measurement invariance of the CLASS across sex, drinker status, and in individuals of three different countries (i.e., U.S., Argentina, and Spain). Additional goals were to evaluate differences on the CLASS (i.e., latent mean differences) as a function of sex, drinker status and country and to compare construct validity (i.e., correlations with alcohol variables) across sex and different countries. **Method:** A large sample of 1,841 college students enrolled in universities from U.S., Spain and Argentina completed, via an online survey, a battery of instruments that assess college alcohol beliefs, drinking motives, alcohol consumption and alcohol-related negative consequences. **Results:** We found that a shortened 12-item version of the CLASS to be invariant across sex and drinker status, but only metric was found across countries. As expected, men and drinkers showed significantly higher scores on the CLASS than women and non-drinkers, respectively. Bivariate correlations between CLASS scores and drinking outcomes strongly supported criterion-related validity of this measure across multiple countries and sex with differing strengths in relationships with alcohol-related constructs. **Conclusions:** Taken together, perceptions of the centrality of alcohol to the college experience appear to be an important target for college student alcohol interventions across various cultures and countries, especially for male college student drinkers.

Key words: college alcohol beliefs; measurement invariance; sex differences; college students; alcohol use; cross-cultural

## 1. Introduction

Globally, extensive research has been conducted identifying risk/protective factors (e.g., personality traits, negative affect, alcohol expectancies) that may contribute to problematic alcohol use among college students, with an eye toward prevention and early intervention (Mallett et al., 2013; Stone et al., 2012; White and Hingson, 2014; Wicki et al.,2010). Perceptions about normative drinking in relevant peer groups (drinking norms) have been found to be a robust risk factor associated with alcohol-related outcomes among college students (Borsari and Carey, 2003; Mallett et al., 2013; Wicki et al., 2010). Yet, most research has focused on two specific types of normative perceptions, descriptive norms (i.e., beliefs about the drinking behaviors of others, Neighbors et al., 2007; Lewis and Neighbors, 2006) or injunctive norms (i.e., beliefs about the degree to which others approve/disapprove of drinking, Neighbors et al., 2008; LaBrie et al., 2010).

Recent research has identified another type of normative perception that may also be an important influence on drinking behavior, perceptions about alcohol and the college ethos. In 2010, Osberg and colleagues developed and validated the College Life Alcohol Salience Scale (CLASS) to assess the internalization of college student drinking culture, or beliefs regarding the degree to which alcohol use is considered an integral part of the college experience. Since its development, the CLASS has been shown to be robustly associated with elevated levels of alcohol use and consequences among college students (Bravo et al., 2017; Osberg et al., 2010, 2011, 2012). Moreover, the CLASS has been shown to have stronger associations with negative alcohol-related consequences than many other established predictors of alcohol outcomes (e.g., descriptive norms, injunctive norms, alcohol expectancies; Hustad et al., 2014; Osberg and Boyer, 2016; Pearson and Hustad, 2014; Ward et al., 2015). Together, these findings suggest

that this type of normative perception may be an important target for intervention.

Despite the increasing research conducted on the college alcohol beliefs assessed by the CLASS, no published study to date has examined the CLASS outside of the U.S. As such, how these beliefs differ across countries is unknown. Given that alcohol drinking on college campuses and college life greatly differs around the world, we believe cross-cultural research examining these beliefs across countries is needed to determine the extent to which these beliefs are an important intervention target in distinct cultural contexts. For instance, living on campus, which has been positively associated with alcohol use (Lorant et al., 2013), is prevalent among U.S. college students, but not among Argentinean or Spanish students. Further, Argentina and Spain are two Spanish-speaking countries in which regular use of alcohol is deeply entrenched in society and associated with meals, family celebrations, and social events. As already noted, it is yet unknown if results from U.S. extends to other countries with different cultural milieu and language. In that sense, the present study represents an extraordinary opportunity to further explore social norms regarding the role of alcohol within the college context across three countries with similarities and unique cultural and college-related components.

Beyond cultural differences, sex differences in perceptions about alcohol and the college experience have been observed. For example, using the CLASS, researchers have found that men endorse higher college alcohol beliefs compared to women (Bravo et al., 2017; Hustad et al., 2014; Pearson and Hustad, 2014). To date, it is unclear whether these findings regarding sex and college perceptions reflect actual differences in the degree to which men and women hold these perceptions, or whether they instead reflect measurement bias in the measure itself. That is, differences that have been reported may be attributed to sex differences in item responses, rather than to sex-based differences in the latent trait of college alcohol beliefs (Millsap, 2012).

Further, the CLASS has been administered among both drinkers and non-drinkers (Osberg et al., 2010, 2011, 2012), yet how drinking status may influence such perceptions and whether the CLASS measures these perceptions similarly across drinkers and non-drinkers is unknown.

### 1.1. Purpose of Present Study

The goals of the present study were to: a) test the extent to which college alcohol beliefs are captured using the same items across different countries (i.e., measurement invariance), sex (men vs women), and drinker status (i.e., non-drinkers vs drinkers), b) examine how men vs. women, drinkers vs. non-drinkers, and individuals in different countries compare on the degree to which college students view drinking to be an integral part of the college experience (i.e., latent mean differences), and c) characterize how this construct relates to drinking motives and alcohol-related outcomes across sex and different countries (i.e., comparing construct validity).

## 2. Method

### 2.1. Participants and Procedures

Participants were college students recruited from four universities across three countries to participate in an online survey regarding personal mental health, personality traits, and alcohol use behaviors (see Bravo, Pearson et al., 2017 for more information on recruitment procedures). Although 1,864 students were recruited across sites, for the present study only data from students that completed the CLASS ($n$=1,841) were included in the final analysis from each sample (two U.S. sites combined, $n$=1,011; 69.7% female; Argentina, $n$=502; 53.8% female, Spain, $n$=328; 72.3% female). At the southeastern U.S. site, participants received research credit for completing the study which may be applied as extra credit for courses at the participating university. At the southwestern U.S. site, participants completed the survey voluntarily and did not receive any compensation for their participation. In Argentina, four cash prizes (each of ≈US

$36) and other items were raffled among the participants who completed the entire survey. In Spain, three checks of 100 euros to be used in office materials (i.e., photocopies, pens, folders) were raffled among the participants. Study procedures were approved by the institutional review boards at the participating universities.

### 2.2. Measurement Translation of the CLASS

Four psychologists, bicultural and proficient in English and Spanish, and with expertise in test adaptation and addictive behaviors, translated the original English version (Osberg et al., 2010) to Spanish. Then, two members of the research team compared the versions and, after a thorough discussion, composed a preliminary version of the instrument. We used a different phrase with one item (i.e., “I would prefer it if my college was not considered a party school”). The item conveys the information that a college is better known for its parties than for its academics. Therefore, we re-worded the item to the Spanish translation of this: "I would prefer that my college was not considered a school known more for its parties than for its academics". Some minor changes were conducted to adapt the wording to Castilian Spanish (see Appendix A for Spanish versions of the items).

### 2.3. Measures

For all measures except the CLASS, composite scores were created by averaging or summing items and reverse-coding items when appropriate such that higher scores indicate higher levels of the construct. Descriptive statistics, reliability coefficients, and significant mean differences across countries for these composite measures are shown in Supplemental Table 1.

#### 2.3.1. CLASS

College alcohol beliefs were assessed using the 15-item College Life Alcohol Salience Scale (CLASS; Osberg et al., 2010) measured on a 5-point response scale (1=*Strongly Disagree*,

5=*Strongly Agree*). In their original psychometric study, Osberg et al. found that the CLASS had excellent internal consistency (samples 1 and 2 combined, α=.90; Sample 3 α=.94). Both construct (Osberg et al., 2010) and predictive validity (Obserg et al., 2011) have been established for the CLASS.

**2.3.2. Drinking Motives**

Drinking motives were assessed using the 12-item Drinking Motives Questionnaire-Revised, Short Form (DMQ-R SF; Kuntsche and Kuntsche, 2009) at the U.S. sites and the 12-item Spanish version (Spanish DMQ-R SF; Mezquita et al., 2016) at the sites in Spain and Argentina. The measure assesses reasons for drinking within four domains (3 items each): social, conformity, enhancement, and coping.

**2.3.3. Alcohol Consumption**

Alcohol consumption was broken down into several indicators that were measured across all sites including two frequency measures (i.e., past 30-day frequency of alcohol use, past 30-day frequency of getting drunk), an indicator of typical quantity, and an indicator of binge drinking frequency (i.e., past 30-day frequency of drinking 4+/5+ SDUs in U.S. and Argentina and 5.5+/7+ in Spain for women/men in a period of two hours or less). Typical quantity was measured with the Daily Drinking Questionnaire (DDQ; Collins et al., 1985). Before completing the DDQ, participants were first presented with a visual guide about typical drinks (specific to each country), in order to help orient them to Standard Drink Units (SDUs). Participants indicated how much they drink during a typical week in the past 30 days using a 7-day grid from Monday to Sunday. The total number of SDUs consumed (summed) were transformed into grams of alcohol taking into account that in U.S and Argentina one SDU is equivalent to 14 grams of alcohol [NIAAA, 2015; International Alliance for Responsible Drinking (IARD),

2016], whereas in Spain is equivalent to 10 grams (Rodríguez-Martos et al., 1999; IARD, 2016). Drinker status was coded as 0=*non-drinkers* (defined as drinking 0 days in the previous month; *n*=352) and 1=*drinkers* (defined as drinking at least 1 day in the previous month; *n*=1,489).

**2.3.4. Negative Alcohol-related Consequences**

Negative alcohol-related consequences were assessed using the 48-item YAACQ (Read et al., 2006) at the U.S. sites and the 48-item Spanish version at the Argentina site (S-YAACQ, Pilatti et al., 2016). In the case of Spain, the Pilatti et al. (2016) version was used, although some items were reworded to Castilian Spanish. Each item was scored dichotomously to reflect presence/absence of the alcohol-related problem in the past month (0=*no*, 1=*yes*). Internal consistency across countries were excellent.

**2.4. Statistical Analysis**

First, we conducted confirmatory factor analyses (CFA) of the CLASS across sites separately and in a total sample using M*plus* 7.4 (Muthén and Muthén, 1998-2015), in order to examine the internal structure of the questionnaire. To evaluate overall model fit, we used model fit criteria suggested by Hu and Bentler (1999) including the Comparative Fit Index (CFI) >.90 (acceptable) > .95 (optimal), Tucker-Lewis Index (TLI) >.90 (acceptable) > .95 (optimal), Root Mean Square Error of Approximation (RMSEA) < .06, and Standardized Root Mean Square Residual (SRMR) < .08. Upon deciding on the best fitting model across all countries, we calculated Cronbach's alpha to test the internal consistency of the measure across sites.

We conducted multi-group confirmatory factor analyses (MG-CFA) using M*plus* 7.4 with a maximum likelihood estimation with robust standard errors (i.e., MLR) to determine the factorial invariance of the questionnaire (i.e., best fitting model) across drinker status (non-drinkers vs. drinkers), sex (men vs. women), and participants in different countries (i.e., U.S.,

Argentina, and Spain). Specifically, we tested three levels of measurement invariance: configural (test whether all items load on the proposed factor), metric (test whether item-factor loadings are similar across groups), and scalar (test whether the unstandardized item thresholds are similar across groups). Metric invariance is necessary when examining associations between the CLASS and other constructs across different groups, and scalar invariance is necessary to compare mean levels across groups. Given that the $\chi^2$ test statistic is sensitive to sample size (Brown, 2015), we used model comparison criteria of $\Delta$CFI/$\Delta$TFI $\geq$.01 (Cheung and Rensvold, 2002) and $\Delta$RMSEA $\geq$.015 (Chen, 2007) to indicate significant decrement in fit when testing for measurement invariance. Finally, construct validity of the measure was assessed using correlation analyses among the CLASS, drinking motives, alcohol use indicators, and negative alcohol-related consequences.

## 3. Results

### 3.1. CFAs

The 15-item CLASS provided poor fit to the data based on most fit indices in the total sample [CFI=.888, TLI=.869, RMSEA=.071 (90% CI [.067,.075]), SRMR=.048] and the Argentinean and Spanish subsamples (model fit was acceptable in the U.S. subsample; see Table 1). Given the poor fit of the 15-item version, we conducted post-hoc modifications to produce a better fitting version of the measure in the total sample. Based on model modification indices, item 10 ("Drinking alcohol is a social event in which every college student partakes") had the biggest impact on model fit. Upon deleting this item, model fit improved significantly ($\Delta$CFI=.016; $\Delta$TFI=.018; $\Delta$RMSEA=.003); however, model fit was still poor on multiple indices [CFI=.904, TLI=.887, RMSEA=.068 (90% CI [.063, .072]), SRMR=.044]. Within this model, model modification indices suggested that item 3 ("I would prefer it if my college was not

considered a party school"; reverse coded) had the biggest impact on model fit. Upon deleting this item, model fit improved significantly (ΔCFI=.017; ΔTFI=.018; ΔRMSEA=-.003) and the model fit was acceptable on most indices [CFI=.921, TLI=.905, RMSEA=.065 (90% CI [.060,.070]), SRMR=.039]. With the 13-item version, the standardized loadings of the indicator variables on their hypothesized factors were all salient (i.e. ≥ .30; Brown, 2015), model fit was acceptable across the total sample and subsamples (see Table 1), and reliability coefficients ranged from .85 to .88 across subsamples and the total sample.

**3.2. Measurement Invariance across Drinker Status and Sex**

Based on the results above, the 13-item CLASS was tested for measurement invariance across drinker status and the configural invariance model provided acceptable fit to the data based on most fit indices: CFI=.917, TLI=.900, RMSEA=.064 (90% CI [.059,.069]), SRMR=.042, which supports configural invariance across drinker status. The metric invariance model also provided acceptable fit to the data based on most fit indices: CFI=.913, TLI=.904, RMSEA=.062 (90% CI [.058,.067]), SRMR=.048. The minimal change on fit indices (ΔCFI=.004; ΔTFI=-.004; ΔRMSEA=.002) supported metric invariance. The scalar invariance model provided a poor fit to the data based on most indices: CFI=.888, TLI=.886, RMSEA=.068 (90% CI [.063,.072]), SRMR=.056. The comparison between the metric and scalar invariance models showed significant differences based on changes in CFI/TFI (ΔCFI=−.025; ΔTFI=-.018) and RMSEA (ΔRMSEA=.006). In order to provide a scalar invariant version of the measure, we conducted post-hoc modifications by comparing the metric invariant model to models constraining the intercept of a specific item to determine what specific item(s) led to the poorer fit of the scaler invariant model.

Although multiple items had significant changes in the CFI/TFI and RMSEA, item 4

("The reward at the end of a hard week of studying should be a weekend of heavy drinking") had the biggest impact on fit indices (ΔCFI=−.037; ΔTFI=-.040; ΔRMSEA=.012). Upon deleting this item, the fit values of the configural, metric, and scalar invariant models improved and in comparing the new metric invariance model and the new scalar invariance model, the minimal change in CFI/TFI (ΔCFI=.007; ΔTFI=-.001; ΔRMSEA=.001) supported scalar invariance (see Table 2). Thus, a 12-item version of the CLASS was found to be invariant across drinker status. Based on these results, a 12-item CLASS was also tested for measurement invariance across sex and was found to be invariant (i.e., configural, metric, and scalar invariance was met; see Table 2). Moreover, CFAs of the 12-item CLASS showed acceptable fit across subsamples (see Table 1). Further, the standardized loadings of the indicator variables on their hypothesized factors were all salient (i.e. ≥ .30; Brown, 2015) and reliability coefficients ranged from .83 to .88 across subsamples and the total sample.

**3.3. Measurement Invariance across Country**

The 12-item CLASS was also tested for measurement invariance across country (see Table 2) and the configural invariance model provided acceptable fit to the data based on most fit indices: CFI=.930, TLI=.914, RMSEA=.066 (90% CI [.060,.071]), SRMR=.040, which supports configural invariance across countries. The metric invariance model also provided acceptable fit to the data based on most fit indices: CFI=.920, TLI=.913, RMSEA=.066 (90% CI [.061,.071]), SRMR=.056. The minimal change on fit indices (ΔCFI=−.010; ΔTFI=.001; ΔRMSEA=.00) supported metric invariance. The scalar invariance model provided a poor fit to the data based on most fit indices: CFI=.823, TLI=.830, RMSEA=.092 (90% CI [.088,.097]), SRMR=.078. The comparison between the metric and scalar invariance models showed significant differences based on changes on fit indices (ΔCFI=−.097; ΔTFI=-.083; ΔRMSEA=.026).

Upon multiple iterations of deleting items to improve scalar model fit (see Supplemental Table 2), we found a 5-item version of the measure that had items that were not individually (i.e., single item intercept constrained) statistically different from the metric model; however, the comparison between the metric and scalar invariance models still showed significant differences based on changes on fit indices (ΔCFI=−.028; ΔTFI=-.014; ΔRMSEA=.007). Taken together, we could not find a scalar invariant version of the CLASS across countries and caution should be taken in comparing latent mean differences across these three countries. Nonetheless, the 12-item version of the CLASS showed metric invariance and thus correlations between the CLASS and outcomes can be compared across countries.

**3.4. Latent Mean Comparisons**

Based on the results of our measurement invariance analyses, we only tested for latent factor score mean differences by sex and drinker status using the 12-item version of the CLASS. Specifically, we conducted latent mean comparisons in M*plus* 7.4 using dummy-coded indicators of drinker status (0=non-drinkers, 1=drinkers) and sex (0=men, 1=women) as predictors of a latent factor of the CLASS. Controlling for the effects of the other predictor, as expected, we found that drinkers reported significantly higher scores on the CLASS than non-drinkers (b=.597, $p$<.001) and men reported significantly higher scores on the CLASS than women (b=-.200, $p$<.001).

**3.5. Construct Validity**

Among the subsample of drinkers (see supplemental Table 1 for significant mean differences across countries on drinking-related variables) we examined bivariate correlations between the 12-item CLASS and drinking-related variables. These were conducted by country ($n$=1,489) and sex ($n$=1,482) and results are summarized in Table 3. Across sex and within all

three countries, college alcohol beliefs were significantly positively associated with all outcome variables at $p<.001$. Further, we used the Fisher *r*-to-*z* transformation (Fisher, 1915), to test the statistical significance ($p<.05$) of differences in correlation coefficients between countries and sex (see Table 3). For the most part, the strength of the correlations did not differ across countries. The only significant differences that we observed were between Spain and the other countries: correlation between CLASS and frequency of alcohol use (stronger in Spain compared to the other two countries), correlation between CLASS and typical quantity in grams (stronger in Spain compared to the other two countries), and correlation between CLASS and negative alcohol-related consequences (stronger in Spain compared to the U.S.). Across sex, we found three significant differences: the correlation between CLASS and coping motives was stronger among women, the correlation between CLASS and enhancement motives was stronger among men, and the correlation between CLASS and frequency of getting drunk was stronger among women. Taken together, there is strong support for the concurrent validity of the CLASS across multiple countries and sex with differing strengths in relationships with alcohol-related constructs.

**4. Discussion**

The present study sought to adapt a Spanish version of the CLASS, examine measurement invariance across sex, drinker status, and nationality, and to examine the construct validity of college alcohol beliefs among college students in the U.S., Spain, and Argentina. We found a 12-item version of the CLASS to be scalar invariant across drinker status and sex, but only metric invariant across countries. Further, we found that drinkers reported significantly higher scores on the CLASS than non-drinkers and women reported significantly lower scores on the CLASS than men. Bivariate correlations with alcohol variables provided evidence for the

construct validity of the CLASS across sex and the three countries.

As in previous work (Hustad et al., 2014; Osberg et al., 2010), CLASS scores were higher among those with greater drinking involvement. This finding offers additional support for the notion that this construct has a significant influence upon alcohol drinking behaviors. Additionally, and most likely reflecting sex-related differences in alcohol consumption (Osberg et al., 2010), men scored significantly higher than women. Beyond latent mean differences, two of the three significant sex-differences deserve special attention: CLASS was more strongly associated with coping motives in women than in men (consistent with Osberg et al., 2010), whereas CLASS was more strongly associated with enhancement motives in men than in women. Although highly speculative, it is possible that women are more likely than men to adhere to college beliefs on the use of alcohol as a means to better fit into the social structure of college and thus use alcohol to cope with the stress resulting from college life. Replication of these findings will bolster confidence in their robustness, and will provide stronger grounding for interpretation of their meaning.

Cultural differences across countries, especially those concerning legislation and idiosyncratic components of college life may have led to a lack of scalar invariance for the CLASS across countries. In Argentina and Spain, the minimum legal age to consume alcohol is 18 years whereas alcohol consumption is not legal until 21 in U.S; thus, items pertaining to "underage drinking" might be interpreted differently across participants. Another important difference is that most college students outside of the U.S. (e.g., European college students; Cugnon, 2015), spend their college years at universities close to home and often do not live on campus (as is the case in Argentina and Spain), which may impact how items referring to "college parties" are interpreted. We did however find evidence of configural and metric

invariance across countries, allowing us to compare the correlations between CLASS scores and drinking outcomes across countries. Despite potential cultural differences, college alcohol beliefs were significantly and positively associated with all drinking variables and these associations were fairly similar in individuals from the three countries, suggesting that these beliefs may be an important target for intervention for college students across various cultures and countries.

### 4.1. Clinical Implications

Despite the ubiquity of norm-based interventions, these interventions have largely focused on descriptive norms (Neighbors et al., 2016) and to a lesser extent injunctive norms (Prince et al., 2014). Although there is a plethora of intervention strategies that could be employed to target college students' perceptions that drinking is an integral part of the college experience, to our knowledge, these normative perceptions have not been directly targeted in any college student alcohol intervention. The specific method by which to best target these normative perceptions is not clear. For example, if college students tend to overestimate the degree to which other college students endorse the beliefs assessed by the CLASS (an untested assumption), these normative perceptions could be targeted as part of a larger personalized normative feedback intervention. However, other approaches may also be viable. For example, two studies have demonstrated that the CLASS partially mediates the effects of impulsivity and sensation seeking on alcohol-related outcomes among college students (Hustad et al., 2014; Pearson and Hustad, 2014), indicating that personality-targeted interventions targeting the CLASS may be appropriate (Conrod et al., 2011).

### 4.2. Limitations and Future Directions

Important limitations to the present study must be noted. The cross-sectional,

correlational nature of the design prevents our ability to make causal or temporal inferences; therefore, longitudinal, experimental studies are needed to better characterize the effects of the normative perceptions captured by the CLASS on alcohol-related outcomes. Although we were able to collect data in three different countries, it is unwarranted to assume that our findings will necessarily generalize to the college student populations at large in each of these countries. Previous studies have shown the CLASS to mediate the predictive effects of personality traits (Hustad et al., 2014; Pearson and Hustad, 2014) and exposure to pro-college drinking films (Osberg et al., 2012). Given that we did not assess these additional risk/protective factors associated with the CLASS (e.g., personality traits; Hustad et al., 2014; Pearson and Hustad, 2014), additional work is needed to determine if these indirect effects via the CLASS hold cross-culturally. Finally, both the 15-item and 12-item version of the CLASS provided acceptable model fit among U.S. subsamples; however, only the 12-item version was found to be scalar invariant across drinker status (analyses available from the authors upon request) and thus we recommend researchers to use the 12-item version in future studies.

**4.3. Conclusions**

Consistent with the goals of the present study, we found that a 12-item version of the CLASS demonstrates scalar invariance across sex and drinker status and metric invariance across three countries (U.S., Argentina, and Spain). Supporting previous research, we found that drinkers (compared to non-drinkers) and men (compared to women) reported higher CLASS scores. Extending previous research, the CLASS was robustly associated with alcohol-related outcomes for men and women and across all three countries examined. Despite some differences in CLASS-outcome associations based on sex or across countries, our results demonstrate that the normative perceptions assessed by the CLASS are a promising intervention target in these

distinct cultural contexts. Additional work is needed to examine CLASS-based interventions that examine CLASS as a mechanism of intervention-induced changes on alcohol-related outcomes.

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Table 1
*Model fit of the CLASS across countries*

| | Overall Fit Indices for 15 item CLASS | | | | | |
|---|---|---|---|---|---|---|
| | $\chi^2$ | *df* | CFI | TLI | RMSEA | SRMR |
| 1. United States | 446.473* | 90 | .923 | .910 | .063 (.057, .068) | .040 |
| 2. Argentina | 258.169* | 90 | .900 | .883 | .061 (.052, .070) | .049 |
| 3. Spain | 227.444* | 90 | .905 | .889 | .068 (.057, .079) | .047 |
| 4. Total Sample | 927.822* | 90 | .888 | .869 | .071 (.067, .075) | .048 |
| | Overall Fit Indices for 13 item CLASS | | | | | |
| | $\chi^2$ | *df* | CFI | TLI | RMSEA | SRMR |
| 1. United States | 334.836* | 65 | .932 | .918 | .064 (.057, .071) | .039 |
| 2. Argentina | 165.258* | 65 | .932 | .918 | .055 (.045, .066) | .041 |
| 3. Spain | 154.520* | 65 | .929 | .915 | .065 (.052, .078) | .042 |
| 4. Total Sample | 573.600* | 65 | .921 | .905 | .065 (.060, .070) | .039 |
| | Overall Fit Indices for 12 item CLASS | | | | | |
| | $\chi^2$ | *df* | CFI | TLI | RMSEA | SRMR |
| 1. United States | 305.656* | 54 | .929 | .913 | .068 (.061, .075) | .040 |
| 2. Argentina | 145.260* | 54 | .932 | .917 | .058 (.047, .069) | .041 |
| 3. Spain | 133.252* | 54 | .929 | .913 | .067 (.053, .081) | .042 |
| 4. Total Sample | 500.592* | 54 | .923 | .906 | .067 (.062, .072) | .038 |

*Note*. * $p < .001$. The significant model $\chi^2$ would suggest poor model fit; however, the model $\chi^2$ is highly sensitive to sample size (Kline, 1998; Jöreskog and Sörbom, 1993).

Table 2

*Measurement invariance testing results of the 12-item CLASS across drinker status, sex, and country*

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| *Drinker Status* | | | | | | | | | | |
| | Overall Fit Indices | | | | | | Comparative Fit Indices | | | |
| | $\chi^2$ | *df* | CFI | TLI | RMSEA | SRMR | Model Comparison | ΔCFI | ΔTLI | ΔRMSEA |
| 1. Configural | 550.44 | 108 | .918 | .900 | .067 (.061, .072) | .041 | | | | |
| 2. Metric | 575.76 | 119 | .915 | .906 | .065 (.059, .070) | .047 | 1 vs 2 | -.003 | .006 | .002 |
| 3. Scalar | 624.95 | 130 | .908 | .907 | .064 (.059, .069) | .049 | 2 vs 3 | -.007 | .001 | .001 |
| *Sex* | | | | | | | | | | |
| | Overall Fit Indices | | | | | | Comparative Fit Indices | | | |
| | $\chi^2$ | *df* | CFI | TLI | RMSEA | SRMR | Model Comparison | ΔCFI | ΔTLI | ΔRMSEA |
| 1. Configural | 570.86 | 108 | .922 | .904 | .068 (.063, .074) | .041 | | | | |
| 2. Metric | 596.78 | 119 | .919 | .910 | .066 (.061, .072) | .045 | 1 vs 2 | -.003 | .006 | .004 |
| 3. Scalar | 652.36 | 130 | .911 | .910 | .066 (.061, .071) | .046 | 2 vs 3 | -.008 | .000 | .000 |
| *Country* | | | | | | | | | | |
| | Overall Fit Indices | | | | | | Comparative Fit Indices | | | |
| | $\chi^2$ | *df* | CFI | TLI | RMSEA | SRMR | Model Comparison | ΔCFI | ΔTLI | ΔRMSEA |
| 1. Configural | 589.94 | 162 | .930 | .914 | .066 (.060, .071) | .040 | | | | |
| 2. Metric | 673.20 | 184 | .920 | .913 | .066 (.061, .071) | .056 | 1 vs 2 | -.010 | .001 | .000 |
| 3. Scalar | 1283.35 | 206 | .823 | .830 | .092 (.088, .097) | .078 | 2 vs 3* | -.097 | -.083 | .026 |

*Note*. We relied on the model comparison criteria of ΔRMSEA ≤.015 (Chen, 2007) and ΔCFI/ΔTFI ≤.01 (Cheung and Rensvold, 2002) to test for measurement invariance. * Significant differences based on changes in CFI/TFI and RMSEA.

Table 3

*Correlations between a latent factor of the 12-item CLASS and study variables among drinkers across country and sex*

| | *Latent Factor of the CLASS* | | |
|---|---|---|---|
| | United States (*n*=760) | Argentina (*n*=431) | Spain (*n*=298) |
| Coping Motives | $.29_{a}$ | $.21_{a}$ | $.25_{a}$ |
| Social Motives | $.51_{a}$ | $.55_{a}$ | $.45_{a}$ |
| Enhancement Motives | $.43_{a}$ | $.49_{a}$ | $.44_{a}$ |
| Conformity Motives | $.31_{a}$ | $.20_{a}$ | $.24_{a}$ |
| Frequency of Alcohol Use | $.23_{a}$ | $.17_{a}$ | $.37_{b}$ |
| Frequency of Getting Drunk | $.33_{a}$ | $.31_{a}$ | $.41_{a}$ |
| Binge Drinking Frequency | $.34_{a}$ | $.32_{a}$ | $.30_{a}$ |
| Typical Quantity in Grams | $.29_{a}$ | $.26_{a}$ | $.44_{b}$ |
| Negative Alcohol-related Consequences | $.30_{a}$ | $.38_{ab}$ | $.47_{b}$ |
| | *Latent Factor of the CLASS* | | |
| | Men (*n*=509) | Women (*n*=973) | |
| Coping Motives | $.21_{a}$ | $.34_{b}$ | |
| Social Motives | $.54_{a}$ | $.49_{a}$ | |
| Enhancement Motives | $.52_{a}$ | $.43_{b}$ | |
| Conformity Motives | $.29_{a}$ | $.31_{a}$ | |
| Frequency of Alcohol Use | $.18_{a}$ | $.24_{a}$ | |
| Frequency of Getting Drunk | $.30_{a}$ | $.40_{b}$ | |
| Binge Drinking Frequency | $.32_{a}$ | $.31_{a}$ | |
| Typical Quantity in Grams | $.24_{a}$ | $.32_{a}$ | |
| Negative Alcohol-related Consequences | $.26_{a}$ | $.34_{a}$ | |

*Note*. All correlations were significant at $p<.001$. Values sharing a subscript in a row indicate correlations that are not significantly different from each other based on Fisher *r*-to-*z* transformations.

Supplemental Table 1

*Descriptive statistics, internal consistency, and mean comparisons of non-CLASS study constructs among drinkers across countries*

| | United States (*n*=754) | Argentina (*n*=428) | Spain (*n*=298) | |
|---|---|---|---|---|
| Non-RTSQ Study Constructs | *M* (*SD*) [α] | *M* (*SD*) [α] | *M* (*SD*) [α] | *Significant Mean Differences* |
| Coping Motives | 2.01 (1.06) [α=.86] | 1.80 (0.92) [α=.75] | 1.54 (0.72) [α=.77] | U.S. > Argentina > Spain |
| Social Motives | 3.07 (1.20) [α=.90] | 2.90 (1.25) [α=.88] | 2.97 (1.17) [α=.85] | None |
| Enhancement Motives | 2.82 (1.11) [α=.79] | 2.51 (1.08) [α=.76] | 2.55 (1.05) [α=.77] | U.S. > Argentina, Spain |
| Conformity Motives | 1.59 (0.90) [α=.86] | 1.32 (0.60) [α=.81] | 1.25 (0.54) [α=.79] | U.S. > Argentina, Spain |
| Frequency of Alcohol Use | 5.93 (5.47) [-------] | 5.99 (5.03) [-------] | 6.50 (5.38) [-------] | None |
| Frequency of Getting Drunk | 2.81 (3.61) [-------] | 1.47 (2.58) [-------] | 2.50 (3.08) [-------] | Argentina < U.S., Spain |
| Binge Drinking Frequency | 1.98 (3.18) [-------] | 1.69 (2.73) [-------] | 2.15 (3.30) [-------] | None |
| Typical Quantity in Grams | 88.48 (107.48) [-------] | 99.24 (118.83) [-------] | 81.07 (85.68) [-------] | None |
| Negative Alcohol-related Consequences | 7.44 (8.58) [α=.94] | 9.52 (8.17) [α=.92] | 9.02 (7.64) [α=.91] | U.S. < Argentina, Spain |

*Note*. A Multivariate ANOVA revealed significant differences across countries on coping motives [$F(2,1477) = 26.76$, $p < .001$, partial $\eta 2=.04$], enhancement motives [$F(2,1477) = 13.65$, $p < .001$, partial $\eta 2=.02$], conformity motives [$F(2,1477) = 30.07$, $p < .001$, partial $\eta 2=.04$], frequency of getting drunk [$F(2,1477) = 23.70$, $p < .001$, partial $\eta 2=.03$], and negative alcohol-related consequences [$F(2,1477) = 9.82$, $p < .001$, partial $\eta 2=.01$]. Significant mean differences were determined via post-hoc comparisons using a Bonferroni correction.

Supplemental Table 2

*Scalar Model fit of the CLASS from 12 items to 5 items*

| | | Overall Fit Indices | | | | | |
|---|---|---|---|---|---|---|---|
| Version | Items Deleted | Model $\chi^2$ | *df* | CFI | TLI | RMSEA | SRMR |
| 12-item | None | 1283.35* | 206 | .823 | .830 | .092 (.088, .097) | .078 |
| 11-item | 14 | 1083.08* | 172 | .936 | .842 | .093 (.088, .098) | .075 |
| 10-item | 14, 2 | 781.51* | 141 | .863 | .869 | .086 (.080, .092) | .069 |
| 9-item | 14, 2, 11 | 587.026* | 113 | .875 | .880 | .083 (.076, .089) | .069 |
| 8-item | 14, 2, 11, 1 | 442.08* | 88 | .884 | .889 | .081 (.074, .089) | .061 |
| 7-item | 14, 2, 11, 1, 5 | 304.57* | 66 | .906 | .910 | .077 (.068, .086) | .060 |
| 6-item | 14, 2, 11, 1, 5, 12 | 186.29* | 47 | .915 | .919 | .070 (.059, .080) | .054 |
| 5-item | 14, 2, 11, 1, 5, 12, 8 | 133.547* | 31 | .931 | .933 | .073 (.061, .086) | .053 |

*Note*. * $p < .001$. The significant model $\chi^2$ would suggest poor model fit; however, the model $\chi^2$ is highly sensitive to sample size (Kline, 1998; Jöreskog and Sörbom, 1993).

**Appendix A**
**Items in Spanish Version of the CLASS**

| Item # | CLASS Items- Spanish Version |
|---|---|
| **1** | Las fiestas con alcohol son una parte esencial de la vida universitaria. |
| **2** | Emborracharse forma parte de convertirse en universitario. |
| **3*** | Preferiría que mi universidad se conociese más por su prestigio académico que por sus fiestas. |
| **4*** | La recompensa después de una dura semana de estudiar debería ser un fin de semana con mucho alcohol. |
| **5** | Pienso que los estudiantes que no salen de fiesta no disfrutan de su experiencia universitaria. |
| **6** | Perderse clases por tener resaca es parte de ser un auténtico universitario. |
| **7** | Una fiesta universitaria no es realmente una fiesta universitaria si no hay alcohol. |
| **8** | Tomar alcohol no es un aspecto importante de la vida universitaria. |
| **9** | Asistir a fiestas donde hay alcohol es la manera más fácil de hacer amigos. |
| **10*** | Tomar (*beber*) alcohol es un acontecimiento social en el que todos los universitarios participan. |
| **11** | La universidad es una época para experimentar con el alcohol. |
| **12** | Una buena fiesta universitaria debería incluir juegos de consumo de alcohol como (barquito peruano, *el beer pong*, yo nunca, el señor del tres, etc.) |
| **13** | Perder el conocimiento u olvidar parte o todo lo que pasó la noche anterior es esperable en la universidad. |
| **14** | Está bien consumir alcohol en la universidad, incluso si eres menor de edad. |
| **15** | Las oportunidades de tomar alcohol y salir de fiesta en la universidad son tan importantes como la experiencia académica. |

*Note.* Item numbers refer to the item number of the English CLASS. *Items not included in the 12-item version that is measurement invariant across drinker status and sex. Words that are in parentheses are words reworded to Castilian Spanish. *Barquito peruano* and *beer pong* are different drinking games played in those countries.